Work Order ID 50623

July 17, 2009 11:39:41 AM

Item ID: D350-748-141TRN **Accept** **Setup Start**

Revision ID: D **Stop**

Item Name: Crosstube Turning Detail

Start Date: 7/24/09 **Start Qty:** 1.00 **Cust Item ID:**

Required Date: 8/14/09 **Req'd Qty:** 1.00 **Customer:**

Reference:

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____ **Run Start**

QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____ **Stop**

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp

Draw Nbr	Revision Nbr
D350-748-141	Rev D

100 0.00

Mori Seiki

MORI SEIKI CNC LATHE LARGE

a.m 09-09-09 (1)

Mori Seiki CNC Lathe Large

Memo 0.00

1-Fill tube with sand & install plugs on both ends as per Folio FA648□2-Turn first side as per Folio FA648□3- File transition lines smooth.

110 QC1- Inspect dimensions to dimension sheet 0.00

QC

a.m 09-09-09 (1)

Quality Control

Memo 0.00

120 0.00

Mori Seiki

MORI SEIKI CNC LATHE LARGE

a.m 09-09-09 (1)

Mori Seiki CNC Lathe Large

Memo 0.00

1-Turn second side as per Folio FA648□2- File transition lines smooth.□3- Scribe Part & Batch as per Dwg D350-748-141

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

Work Order ID 50623

July 17, 2009 11:39:41 AM

Item ID: D350-748-141TRN
Revision ID: D
Item Name: Crosstube Turning Detail

Start Date: 7/24/09 **Start Qty:** 1.00
Required Date: 8/14/09 **Req'd Qty:** 1.00
Reference:

Accept

Setup Start
Stop

Cust Item ID:
Customer:

Run Start
Stop

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____
QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
130	QC1- Inspect dimensions to dimension sheet	0.00							
QC	**Memo**	0.00				A.M	09	-09	-090
Quality Control									
140	QC8- Inspect parts - second check	0.00							
QC	**Memo**	0.00				1	Ø	-	AWM9-10-06
Quality Control									
150		0.00							
Large Fab	Large Fab								
Large Fab	**Memo**	0.00				1	Ø	-	AWM 9-10-06
Large Fab	Grind machining marks								

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

Work Order ID 50623

July 17, 2009 11:39:41 AM

Item ID: D350-748-141TRN
Revision ID: D
Item Name: Crosstube Turning Detail

Start Date: 7/24/09 **Start Qty:** 1.00
Required Date: 8/14/09 **Req'd Qty:** 1.00
Reference:

Cust Item ID:
Customer:

Accept **Setup Start** **Stop** **Run Start** **Stop**

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____
QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
160	Outsource process - Heat Treat	0.00							
Outsource1	**Memo**	0.00							
Outsource process - Heat Treat	Issue P/O: 10539 ☐Heat Treat to min 180 KSI As per Dwg D350-748-141 ☐(MIL-T-6736 OR AMS 2759-1C)☐Sand Blast tube after Heat Treat☐Possibe Supplier: Vac Aero☐Ensure Certificate of Conformity is attached								
170	Receive & Inspect for Damage & Mat'l Certs	0.00							
Packaging	**Memo**	0.00							
Packaging	Ensure certificate of conformaty is attached								
180	QC6- Inspect dimensions to drawing	0.00							
QC	**Memo**	0.00							
Quality Control									

09-10-7

7/9/10 GC

=> 8/11/23

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

Work Order ID 50623

July 17, 2009 11:39:41 AM

Item ID: D350-748-141TRN
Revision ID: D
Item Name: Crosstube Turning Detail

Start Date: 7/24/09 **Start Qty:** 1.00
Required Date: 8/14/09 **Req'd Qty:** 1.00
Reference:

Accept **Setup Start** **Stop**

Cust Item ID:
Customer:

Run Start **Stop**

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____
QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
190	Packaging	0.00							
Packaging									
	Memo	0.00							
Packaging	Identify and stock in kanban rack☐Location: Back Hall					MB 09-11-23			
200	QC21- Final Inspection - Work Order Release	0.00					09/11/24		
QC	**Memo**	0.00							
Quality Control							MF 09-11-23		

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

Picklist Print

July 17, 2009 11:39:40 AM

Work Order ID: 50623

Parent Item: D350-748-141TRNRevD

Parent Item Name: Crosstube Turning Detail

Start Date: 7/24/09 **Required Date:** 8/14/09

Comments:

Start Qty: 1.00 **Required Qty:** 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
D6017-115RevA		Manufactured	No			110	Each	42.0000	1.0000			

Crosstube Material

Warehouse Location	Loc Qty	Loc Code
Main Warehouse		
LG	42	
32912	42	

O.M 09.09.09

1

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

DART AEROSPACE LTD	Work Order:	50623
Description: Crosstube Assembly (AS350/355 High Fwd)	Part Number:	D350-748-141
Inspection Dwg: D350-748-141 **Rev:** D		Page 1 of 1

FIRST ARTICLE INSPECTION CHECKLIST

[X] First Article [] Prototype

	Inspection Sheet Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	2.240	+0.005/-0.000	2.241	✓			
	2.180	+0.005/-0.000	2.184	✓			
	2.180	+0.005/-0.000	2.183	✓			
	2.237	+0.005/-0.000	2.240	✓			
	2.272	+0.005/-0.000	2.275	✓			
	2.306	+0.005/-0.000	2.309	✓			
	2.339	+0.005/-0.000	2.339	✓			
	2.339	+0.005/-0.000	2.339	✓			
	0.062	+/-0.010	0.062	✓			
	4.26	+/-0.030	4.281	✓			
	R0.063	+/-0.010	R0.063	✓			
	R0.50	+/-0.030	R0.500	✓			
SIDE B	2.240	+0.005/-0.000	2.241	✓			
	2.180	+0.005/-0.000	2.184	✓			
	2.180	+0.005/-0.000	2.183	✓			
	2.237	+0.005/-0.000	2.240	✓			
	2.272	+0.005/-0.000	2.275	✓			
	2.306	+0.005/-0.000	2.309	✓			
	2.339	+0.005/-0.000	2.339	✓			
	2.339	+0.005/-0.000	2.339	✓			
	0.062	+/-0.010	0.062	✓			
	4.26	+/-0.030	4.281	✓			
	R0.063	+/-0.010	R0.063	✓			
	R0.50	+/-0.030	R0.500	✓			
	110.27	+/-0.060	110.290	✓			

Measured by:	A.M	Audited by:	AWM	Prototype Approval:	N/A
Date:	09-09-09	Date:	9-9-15	Date:	N/A

Rev	Date	Change	Revised by	Approved
A	06.11.09	New Issue (P/O D350-748-101)	KJ/JLM	
B	07.10.24	Dwg Rev updated	KJ/EC/DD	

DESIGN	DRAWN BY	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED	APPROVED	DRAWING NO. D350-748-141	REV. D SHEET 1 OF 3
DATE 06.10.31		TITLE CROSSTUBE (AS 350/355 HI FWD)	SCALE .NTS

A	06.03.31	NEW ISSUE
B	06.06.30	ADD D6017-115 & PRIME AND PAINT
C	06.08.14	ADD CAD PLATING
D	06.10.31	MAG. PARTICLE AND CAD PLATE AS MFD.

RELEASED
06.10.31

QTY	P/N	DESCRIPTION
X	D350-748-141	CROSSTUBE ASSEMBLY (AS 350/355 HI FWD)
1	D6017-115	CROSSTUBE (OR D6015-125)
2	D3502-1	SUPPORT
2	D2856-400-710	ABRASION STRIP
1	AELS-1032-225	INSERT
1	AN960JD10	WASHER
2	MS21920-20	CLAMP (PER DART SPEC. M-MS21920-20)
1	MS27039-1-10	SCREW

UNDER REVIEW
09.02.05
PER DER #09.001

D350-748-141 CROSSTUBE:

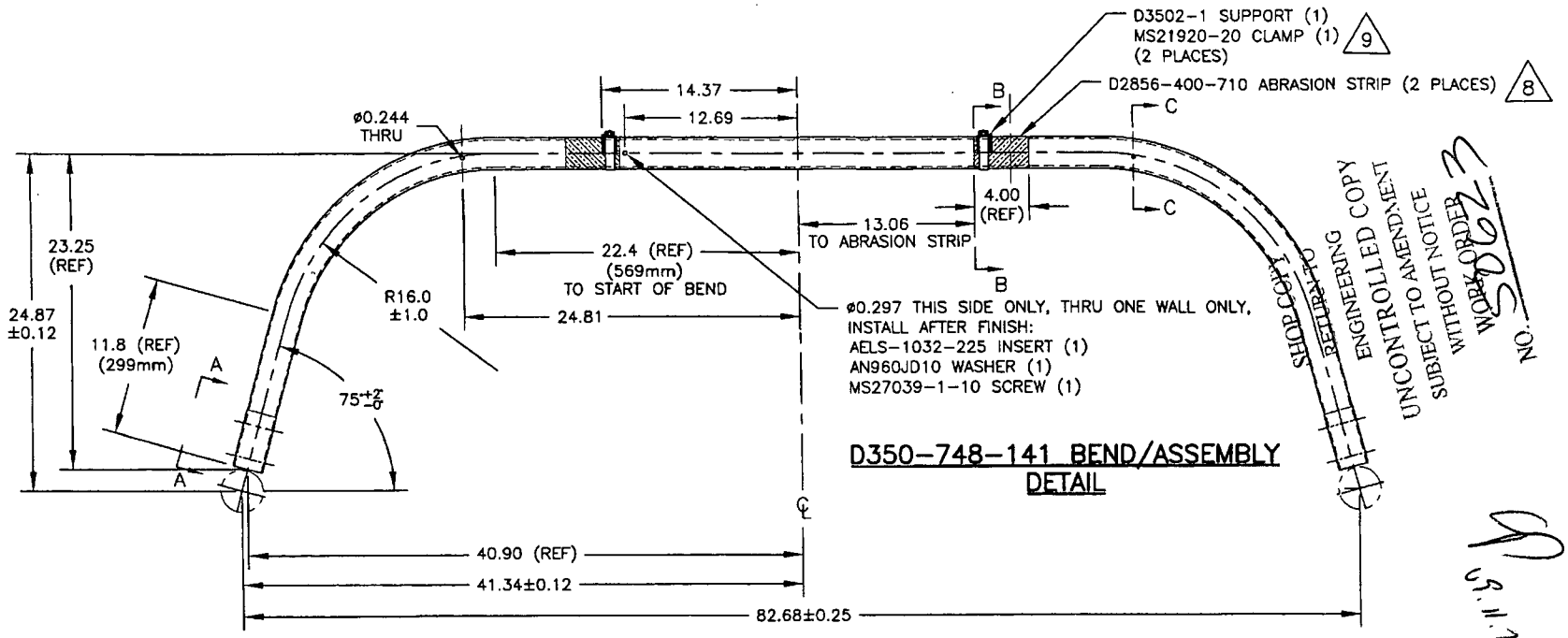
1) MATERIAL: MANUFACTURED FROM D6017-115 OR D6015-125
 FINISHED LENGTH = 110.27±0.06
2) MACHINE PER MACHINING DETAIL ON PAGE 3. BLEND OUT ALL EDGES FROM MACHINING LONGITUDINALY, TRANSITIONS SHOULD BE SMOOTH. NOTE: ALL HOLES ARE DRILLED AFTER BENDING.
3) SCRIBE DART PART NUMBER AND BATCH NUMBER IN THIS AREA WITH VIBRATING STYLUS.
4) BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
5) HEAT TREAT TO MIN. 180 KSI PER MIL-T-6736 OR AMS 2759-1C AFTER TURNING
6) FINISH: MAGNETIC PARTICLE INSPECT PER DART QSI 038 4.2
 CADMIUM PLATE PER AMS-QQ-P-416B, CLASS 1, TYPE II
 PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
 PAINT OUTSIDE PER DART QSI 005 4.2
7) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO CRACKING/CHIPPING/GROOVES.
8) INSTALL D2856-400-710 ABRASION STRIP WITH A GAP ON BOTTOM SIDE OF CROSSTUBE, CENTERED OPPOSITE D3502-1 SUPPORT, PER QSI 035.
9) TORQUE MS21920-20 CLAMPS 60 TO 80 IN-LB
10) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
11) ALL DIMENSIONS ARE IN INCHES
12) PART IS SYMMETRIC ABOUT CENTERLINE EXCEPT FOR Ø0.297 HOLE.

09.11.24

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WITHOUT NOTICE
WORK ORDER
NO. 30623

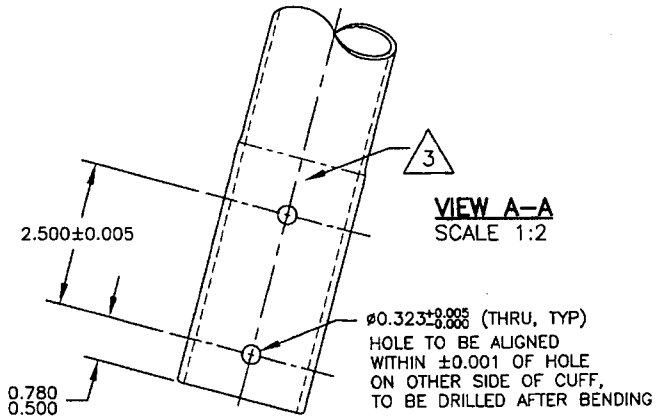
OK 07.10.22

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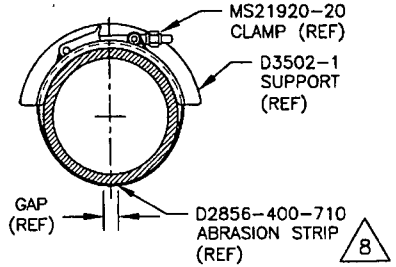
D350-748-141 BEND/ASSEMBLY DETAIL

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WORK ORDER NO. 7295

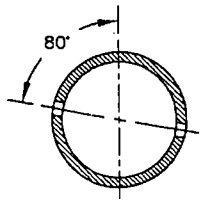


VIEW A-A
SCALE 1:2

SECTION B-B
SCALE 1:2



SECTION C-C
SCALE 1:2



GP OK 09.11.24

UNDER REVIEW
09.02.05

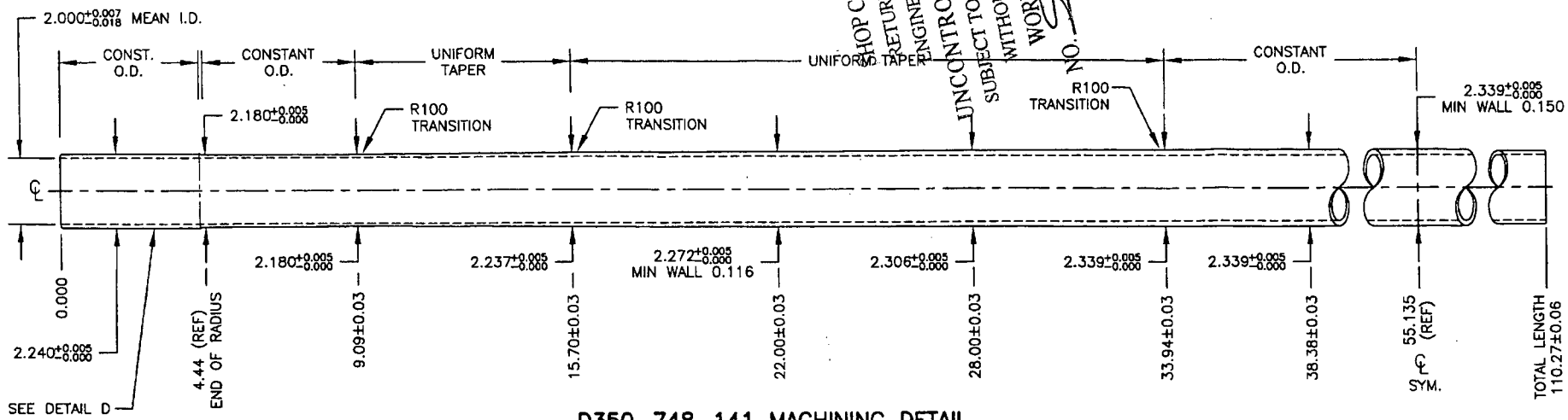
UNDER REVIEW
09.2.16
OK GP 09.10.22

RELEASED
06.10.31

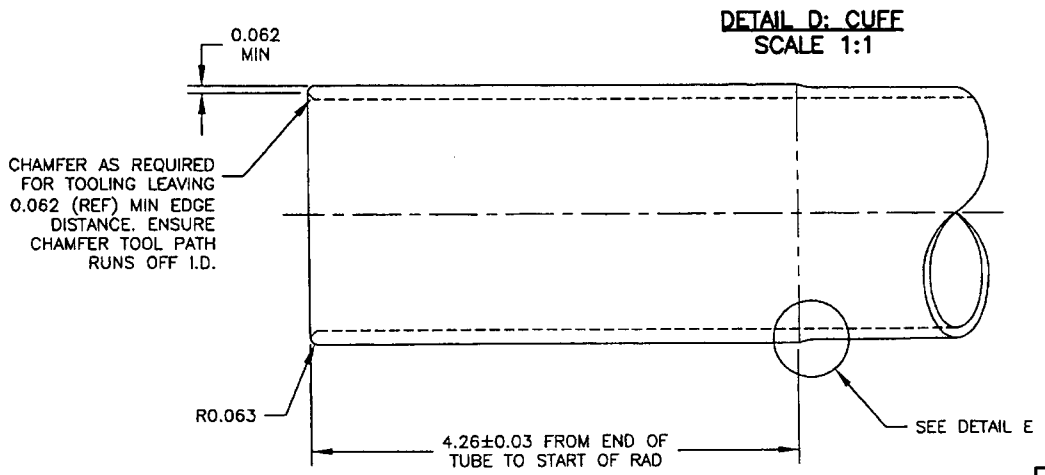
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DESIGN	DRAWN BY	DART AEROSPACE LTD. HAWKESBURY, ONTARIO, CANADA	
GP	GP		
CHECKED	APPROVED	DRAWING NO.	REV. D
		D350-748-141	SHEET 2 OF 3
DATE		TITLE	SCALE
06.10.31		CROSSTUBE (AS 350/355 HI FWD)	1:8

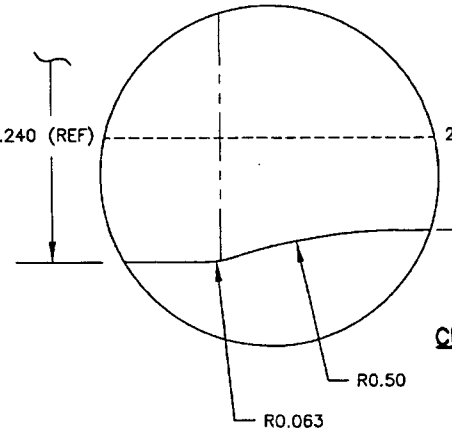
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WORK ORDER NO. 30623



D350-748-141 MACHINING DETAIL



DETAIL D: CUFF
SCALE 1:1



DETAIL E: CUFF TRANSITION
SCALE 9:1

UNDER REVIEW
09.02.05

UNDER REVIEW

RELEASED
06.10.31

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DESIGN	DRAWN BY	DART AEROSPACE LTD. HAWKESBURY, ONTARIO, CANADA	
CHECKED	APPROVED	DRAWING NO. D350-748-141	REV. D SHEET 3 OF 3
DATE 06.10.31		TITLE CROSSTUBE (AS 350/355 HI FWD)	SCALE 1:3

VAC AERO INTERNATIONAL INC.

RELEASE NO

GST No. : R105468102

OAK 113616

[X] HEAD OFFICE
1371 SPEERS ROAD, OAKVILLE, ONTARIO
CANADA L6L 2X5
TEL: (905) 827-4171 FAX: (905) 827-7489

[] 2009 WYECROFT ROAD, UNIT B
OAKVILLE, ONTARIO
CANADA L6I 6J4
TEL: (905) 827-7377 FAX: (905) 827-1380

[] QUEBEC DIVISION
7450 RUE VÉRITÉ STREET, ST. LAURENT, QUÉBEC
CANADA H4S 1C5
TEL: (514) 334-4240 FAX: (514) 334-6269

11/03/20
MM / DD / YY

BILL TO: 1DAR01
DART AEROSPACE LTD.
1270 ABERDEEN ST.
HAWKESBURY, ON

K6A 1K7

SHIP TO : DART AEROSPACE LTD.
1270 ABERDEEN ST.
HAWKESBURY, ON

K6A 1K7

DATE SHIPPED	SHIP VIA	F.O.B.
11/03/2009		ORIGIN
CUSTOMER P/O No.	JOB No.	TERMS
10539		NET 30 DAYS

PART No.	DESCRIPTION	UOM	QTY ORD	QTY SHPD	TEST RESULTS
D350-748	-141/241	EA	12	12	

Process Specifications: Procedure: 4353
HEAT TREATED TO 180 KSI MIN. PER DRAWING
100% HARDNESS CHECKED AS PER ASTM E-18
40/45 HRC
MATERIAL: 4130

4 PIECES B48603, B48604, B48605, B48606, P/N D350-748-241
8 PIECES B50262, B50627, B50628, B50629, P/N D350-748-141
B50621, B50622, B50623, B50625

100% HARDNESS TESTE
42/43 HRC

V.A.I.O. TH. 25 Q.C.

OK 09.11.23

I hereby certify that the material covered by this release note has been inspected and tested and conforms to all specifications relevant thereto in accordance with the conditions of the contract / or purchase order.

ON BEHALF OF VAC AERO INTERNATIONAL INC.

V.A.I.O. TH. 25 Q.C.

Authorized Q.C. Inspector

MTI METAL TREATING INSTITUTE

INTERTEK AS9100 • ISO 9001

Nadca Heat Treating